Applicant: Mikko Heinonen
Application No.: 10/630,362
Art Unit: 3654

Remarks

Claims 1–9 remain pending in the application. In the Office action dated Oct. 6, 2004, the examiner objected to the drawings as not showing "a spring". Claims 2–3 were objected to as containing informal language. Claims 1–2, and 4–9 were rejected as anticipated by Myron. Claim 3 was indicated as allowable if rewritten in independent form including all limitations of the base claim and any intervening claims.

Informalities in claims 2, 5, and 7 have been corrected. In addition redundant language has been removed from claim 5. Claims 6 and 9 have been amended to clarify that the parameter being controlled is "the maximum load applied to the load cell".

It is respectfully submitted that the drawings show every feature of the inventions specified in the claims. The claims define a member having a flexible portion, and the flexible portion having a spring constant. Spring constant is defined as: The constant of proportionality k which appears in Hooke's law for springs $F = -kx$, where F is the applied force and x is the displacement from equilibrium. The spring constant has units of force per unit length. (See http://scienceworld.wolfram.com/physics/SpringConstant.html) thus the member has portions which are flexible, said flexible portions being illustrated in the drawings and called out as *64*. From paragraph [0018] "By design choice, the cantilevered beam 64 forms a flexible member or flexible portion of the rotating member, which portion has a selected amount of beam flexure so as to allow significant deflection of the beam 64 as the load cell 58 is loaded."

Claim 2 has been amended to more clearly position the pivoting arm between the reel spool and the load cell, thus clearly distinguishing over *Myren* where the arm 44 has the load cell mounted to it, and the structure defining the load cell extends towards the reel spool.

Claims 1–9 as amended distinguish over *Myren*. *Myren* discloses at col 4, lines 50–57:

> Various types of force-sensing elements can be used for measuring a force that is proportional to or indicative of the linear nip load. For instance, another preferred embodiment of the invention includes a resilient element arranged such that the force applied to the carriage to create the linear nip load causes the resilient element to measurably deform. Advantageously, the resilient element comprises a spring or load cell.

Thus *Myren* suggests measuring deformation of a resilient element, which is a spring or a load cell. Claim 1 has a first member which engages the reel spool, and a flexible portion of the first member engages the load cell, and claim 1 includes a stop which limits motion of the first member. In *Myren* it is the deflection of the resilient element which is measured to determine the load. So in *Myren* the flexible element is either part of the structure forming the load cell or is the load cell in itself. As shown in FIG. 3 of *Myren,* where the flexible element is part of the load cell, a stop is employed to limit the travel of the spring element, and the length of the spring is measured to determine load. In *Myren*, however, the resilient element is not arranged to engage a load cell, and at the same time, is not prevented by a stop from overloading the load cell. *Myren* solves the same problem as applicant, but in a substantially different way by providing a load measuring sensor which itself bottoms out when too large a load is applied. Applicant's claimed arrangement is summarized by the following excerpts of paragraphs 6 and 17:

> [0006]A load cell is positioned on the carriage with a pivoting arm between the load cell and the reel spool bearing housings. The load cell, and the flexibility of the pivot arm are selected so that the pivot arm bottoms out on a stop before the load cell is subjected to more than its design load.
>
> [0017] Each load cell 58 is positioned to be engaged by a rotating first member 50 as the member 50 moves toward the downstream stop 56. Load cells are typically designed with relatively little deflection so that deflection of the load cell does not affect the mechanical properties of the mechanical system in which it is incorporated. Thus a load cell can be used to replace a substantially rigid support, or is designed to replace a pin or a bolt in a mechanical linkage while preserving the properties of the bolt or support which deflect little under load. Although the stiffness of the load cell is an advantage in designing load cells into structures, this feature has the disadvantage that if the structure is subjected to transitory loads caused, for example, by one part hitting or coming to a sudden stop against another, the capabilities of the load cell must be large or the limits of the load cell may be exceeded by the transitory loads, this can have detrimental effects on the reliability and accuracy of the load cell.

In applicant's apparatus and method, a spring engages a load cell, and the spring is

restricted in its motion to protect the load cell from excessive loads. Applicant's arrangement avoids the necessity of making accurate measurements of distance and correlating those with force, which *Myren* requires where a spring element and a stop are part of the load cell. Where a load cell is used in *Myren*, there is no provision to limit load. Applicant's claimed invention provides a load force, limited by a stop, to a load cell. Thus applicant's invention has an additional step/structure. It does not employ a load cell incorporated into the shaft of the roll 60 (see FIG. 3 of *Myren*) as suggested in *Myren* Col. 9, lines 15–16, which directly measures load, nor does applicant's invention employ a load sensor 50 which itself incorporates a load limiting stop. Rather applicant's invention interposes a flexible member limited by a stop between the load and a load cell so the flexible member plays no part in measuring the load, only transmitting the load, as limited by the stop. Applicant's invention has an advantage over *Myren*, i.e., it can be used with an off-the-shelf load cell such as noted in the specification [0021] of the application.

Myren discloses (see FIG. 3) how to construct a load cell which measures displacement of a spring as the spring is compressed by a load, and which incorporates a stop which prevents the spring from responding to loads above a selected value. Applicant's invention is a structure interposed between the load and the load cell which limits the amount of load which can be applied to the load cell.

Claim 5 is a method which includes a step in which the maximum load with which a first member can engage the load cell is controlled by the selected spring constant of flexible portions of a first member. *Myren* discloses only a spring which is *part of the load sensor*, and bottoms out at a selected load but does not limit the load applied to the load cell.

Claims 2 and 7 further distinguish over *Myren* by employing a resilient member which is pivotally mounted by a pivot base (62) to a pivot bearing (52) on an arm (48) of the carriage (40). The arm 44 of *Myren* corresponds to the arm (48) of the application, not the member (50) which is the pivoting arm of the claims.

Claims 6 and 9 cannot properly be read on the device of *Myren*. The spring constant of

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the spring in *Myren* determines the maximum *measurable range* of the load cell of *Myren*, it cannot at the same time be selected to control the *maximum load* which can be applied to the load cell. Claims 6 and 9 clearly describe selecting a spring constant to control the maximum load with which the first members can engage the load cells and do not describe a spring constant defining the maximum load measurable as in *Myren*.

Claim 8 is a method which includes the step of the spring constant being selected to control the maximum load on the load cell when the loading member is engaged with the stop. *Myren* discloses only a spring which is *part of the load sensor*, and bottoms out at a selected load but does not limit the load applied to the load cell.

Applicant notes that the information disclosure statement filed by applicant with the application which forms a part of the electronic file wrapper and which has a mail room date of Jul. 30, 2003 has apparently not been reviewed by the examiner. The examiner is requested to review the electronic file wrapper and provide an initialed copy of the SB/08A form from Jul. 3, 2003, as contained in the electronic file wrapper.

Applicant believes that no new matter has been added by this amendment.

Applicant submits that the claims, as amended, are in condition for allowance. Favorable action thereon is respectfully solicited.

Respectfully submitted,

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